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DATASHEET

DST111

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Remote Road Temperature Sensor DST111



DST111 provides a unique remote alternative to measuring road surface temperature. By measuring the infrared radiation emitted by the surface and applying intelligent signal processing, the sensor provides a reliable remote surface temperature measurement.

Features

- Remote temperature measurement
- Eliminates the traditional nighttime problem of too cold road temperature readings when the sky is clear
- No need for road specific emissivity adjustment
- Easy and low-cost installation and maintenance
- No internal moving parts
- Stable measurement results even with intense traffic
- Weather-proof, durable design
- Reports air temperature and humidity
- Easy integration with Vaisala Road Weather Station RWS200

Reliable infrared measurements

DST111 provides reliable results in conditions where most of the commercially available infrared sensors fail. At nighttime, when the road surface is cooling under a clear sky, conventional infrared sensors provide an error of up to −3 °C due to emissivity conditions of the road surface. DST111 compensates for this error by using wavelengths where mirrored radiation is not visible. This also eliminates the need for road specific emissivity adjustment.

No traffic disruption for installation or maintenance

Installation of DST111 is easy, requiring no slot cutting or road closure. Supplied with solar/GSM options, the sensor is ideal for standalone operation in remote or in-fill locations and on bridge decks. The sensor is simply installed on a mast or an existing structure beside the road. DST111 can also be installed alongside an existing Vaisala RWS200 or the earlier ROSA or LX-RPU Road Weather Stations.

Great combination with DSC111 or DSC211

DST111 can be combined with Vaisala Remote Road State Sensor DSC111 or DSC211. This combination provides all key parameters for road weather, such as road temperature, road state, and grip. The DST111 data also enables DSC111 and DSC211 to report frost, and it improves their autocalibration, impacting long-term stability.

Technical data

Measurement performance

Measuring distance	2–15 m (6 ft 7 in – 49 ft)
Installation angle from the horizontal line	30–85° (35–65° recommended)
Measuring area diameter	150 cm at 10 m (59.1 in at 32 ft)
Road temperature	
Observation range	−40 ... +60 °C (−40 ... +140 °F)
Resolution	0.1 °C
Accuracy (RMS error [1])	0.3 °C (0.5 °F)
Time constant	1 min
Data refresh time	30 s

1) *The RMS (root mean square) error of the surface temperature reading is 0.3 °C in typical freezing conditions when compared to a reference thermometer installed on the road surface. This accuracy is valid when the difference between the device temperature and the surface temperature is less than 10 °C and the device temperature is in the range of −40 ... +40 °C. (In the range of +40 ... +60 °C the error may be increased by an offset of ±1.5 °C.)*

HMP60 measurement performance

Relative humidity [1]	
Measurement range	0–100 %RH
Resolution	0.1 %RH
Typical accuracy at +20 °C (+68 °F)	±3 %RH (0–90 %RH) ±5 %RH (90–100 %RH)
Air temperature [1]	
Measurement range	−40 ... +60 °C (−40 ... +140 °F)
Resolution	0.1 °C
Typical accuracy at +20 °C (+68 °F)	±0.6 °C (±1.1 °F)
Dew point temperature [1]	
Measurement range	−40 ... +60 °C (−40 ... +140 °F)

1) *The relative humidity, air temperature, and dew point readings of HMP60 are mainly intended for internal compensation of DST111. The accuracy is not as high as that of the HMP155 sensor with a proper solar radiation shield.*

Operating environment

Operating temperature	−40 ... +60 °C (−40 ... +140 °F)
Storage temperature	−55 ... +60 °C (−67 ... +140 °F)
Operating humidity	0–100 %RH
IP rating	IP65

Inputs and outputs

Input voltage	9–30 V DC
Average input current	1.4 mA at 24 V
Average power consumption	0.05 W at 24 V
Communication interface	Isolated RS-485
Connectors	Male M12 (5 pins) including RS-485 and power in Cable connector Ø 15 mm (0.59 in)
Cables	3–150 m (9 ft 10 in – 492 ft) [1] One end without connector 0.6 m (1 ft 12 in) extension cable to DSC111 or DSC211

1) *Cables longer than 50 m (164 ft) require a minimum of 24 V input.*

Mechanical specifications

Dimensions (H × W × D)	125 × 100 × 320 mm (4.92 × 3.94 × 12.60 in)
Weight	1.9 kg (4.19 lb)
Mounting	Fits on a support arm with cross-section of 40 × 40 mm (1.57 × 1.57 in)
Materials	
Cover	ABS plastic
Mounting bracket	POM-C
Other parts	Aluminum

Compliance

EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) as amended by 2015/863
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment FCC part 15 B, Class B ICES-3 / NMB-3 (Class B)
Environmental	EN IEC 63000:2018
Vibration	IEC 60068-2-6, Level 2 g
Application standards	EN 15518-3:2023, Winter maintenance equipment - Road weather information systems - Part 3: Requirements on measured values of stationary equipment



Remote Road Temperature Sensor DST111 with Remote Road State Sensor DSC211

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